

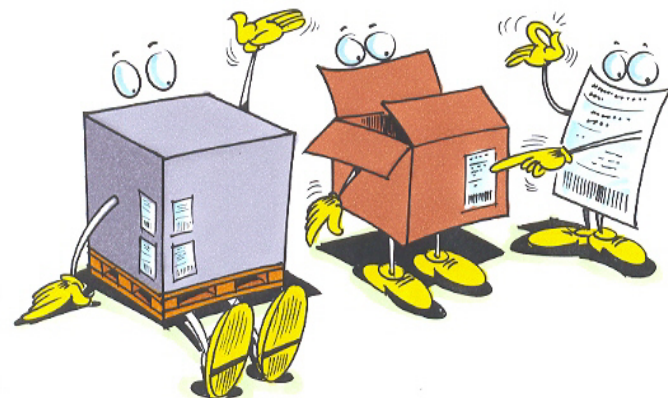
Bar Coding Systems

Traceability of Fish and Fish Products:
Technologies and Management
Systems

Zaragoza, 17-21 October 2005

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Topics covered

- Bar codes
- GS1 Numbering System/TraceFish identification
- Bar Coding Systems
- Printers, Data Capture and Reading equipment
- Labels

Bar Codes

- Coded presentation of information (letters/numbers) by using bars, that make possible automated identification of items and automated data capture
- Several bar code standards exist
 - Coda Bar
 - Interleaved 2 of 5
 - Code128 (used by GS1)
 - PDF417 (2 dimensional)

Why using Bar Codes?

- The main motive of applying bar codes is to make information handling more efficient and reliable by using equipment for automatic data capture in the supply chain
- More in details;
 - Standardised numbering system
 - Standardised identification of trade items
 - Standardised data element names
 - Common “language”
 - No need for handwritten or human readable text
 - May be read by electronic devices in a accurate manner
 - Beneficial in international trade
 - Beneficial in integrated supply chains
 - Beneficial inside large corporations
 - Fulfilment of supermarket requirements

Applications/benefits of bar codes

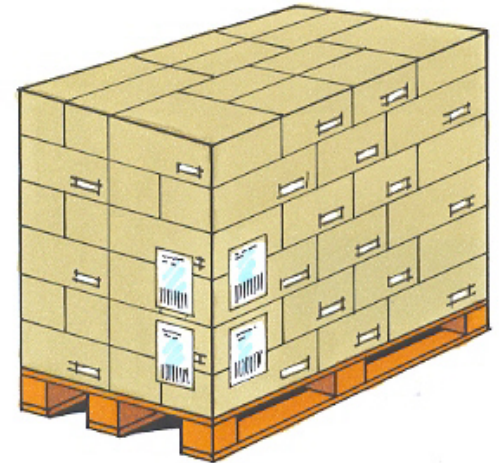
- Identification of product types (e.g. one bottle of coke)
- Unique identification of trade units (single trade unit and logistical units)
- Efficient retrieving of prize information at point of sale
- Efficient outbound and inbound material control in all links/stages of the supply chain
- Efficient picking/sorting of trade units with particular properties (weight, production date, etc)
- Reliable data capture
- Link to software systems
- Reduced data punching (information registered only once)
- Makes electronic exchange of information possible

History

- Humans had unique personal numbers
- In the beginning of the 70ties the idea of giving “everything” unambiguous numbers caught on
- In 1973 introduced US trade business a code system called UPC (Universal Product Code)
- Europe followed up in 1977 with the establishment of the EAN organization (European Article Numbering)
- Now extremely common in retail sector for identification of consumables
- Also common as information carrier on logistical units in the distribution chain

Bar Codes - readability

- To be able to read bar codes in a semi-automated or fully automated way the following conditions are important;
 - Print quality (several printing techniques, and label types)
 - Bar code size (both physical size of bar codes and amount of information in the bar code)
 - Reading distance
 - Placement of the bar code on the trade or logistic unit



1D codes for retail use

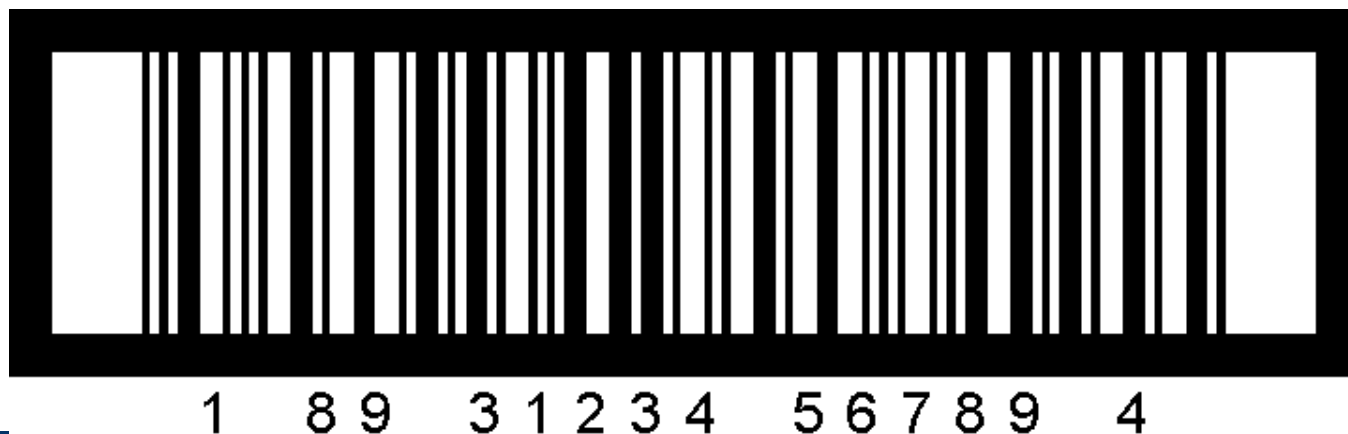
■ EAN 8



■ EAN 13

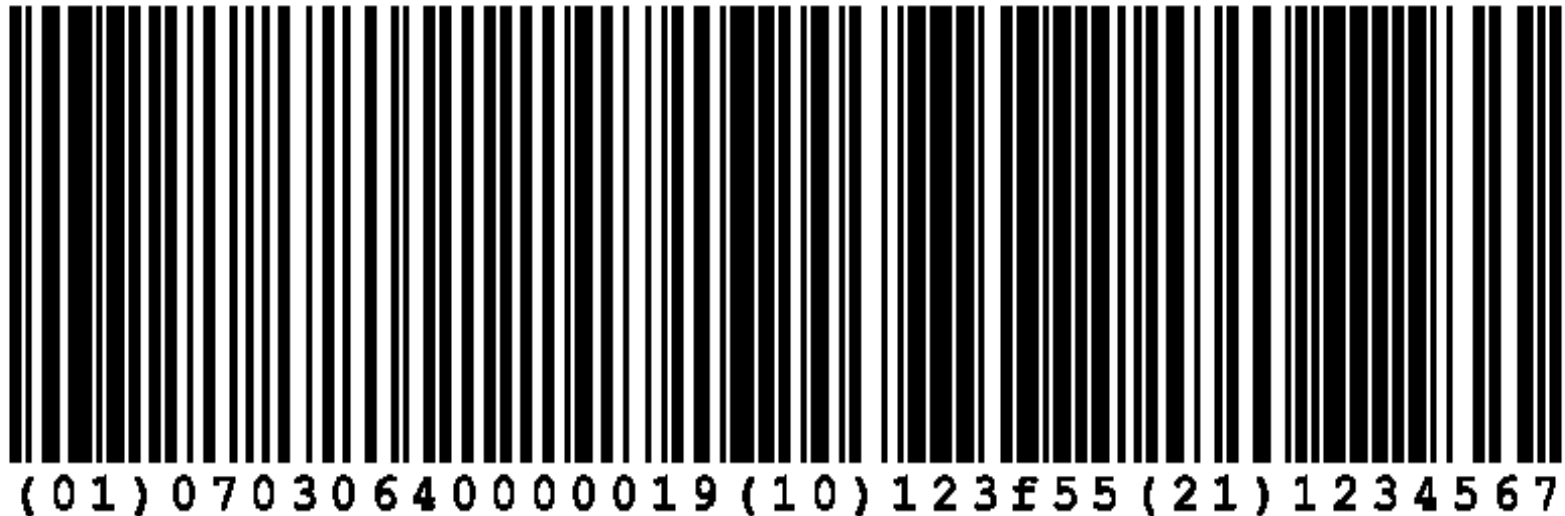


■ ITF 14



1D codes for supply chain use

- The UCC/EAN-128 symbology is a variant of Code 128 symbology. Exclusively licensed to GS1. Not intended to be read on items passing through retail checkouts. This is the only EAN.UCC endorsed symbology that allows the encoding of information additional to identification.



2D codes for supply chain use

- 2D codes emerged from barcodes because of the need for increased storage capacity and smaller print size

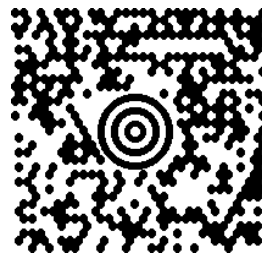
- PDF417



- DataMatrix



- MaxiCode



EAN Numbering system

■ EAN 13

- Unique identification of trade item type (Article number/GTIN).
- E.g. one ½ l bottle of coca cola has one number in all countries
- Number specifies country of production, number of food business operator and number of product type



Brand owner information access

- <http://www.ean.no/>
- Click GEPIR
- Response of the EAN database:
- 5410000999993 **Number of hits : 1 EAN number**
Company name / Address Contact 544912XC COCA-
COLA SERVICES ACCOUNTS PAYABLE DPT.
Chaussée de Mons 1424 BE-1070 BRUXELLES *Tel. :*
02/559.20.00 Fax : 02/559.20.01

EAN Numbering system

■ EAN 128

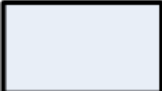
- List of predefined data elements that may be combined in bar codes
- Application Identifiers (AI) specifies the data element
- Identification of trade item types; article number (GTIN)
- Unique identification of logistic units (SSCC)
- Unique identification of locations (GLN)

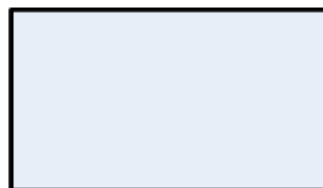
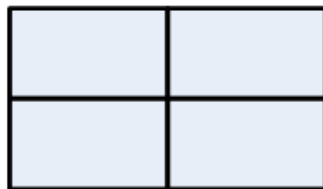


EAN Numbering system

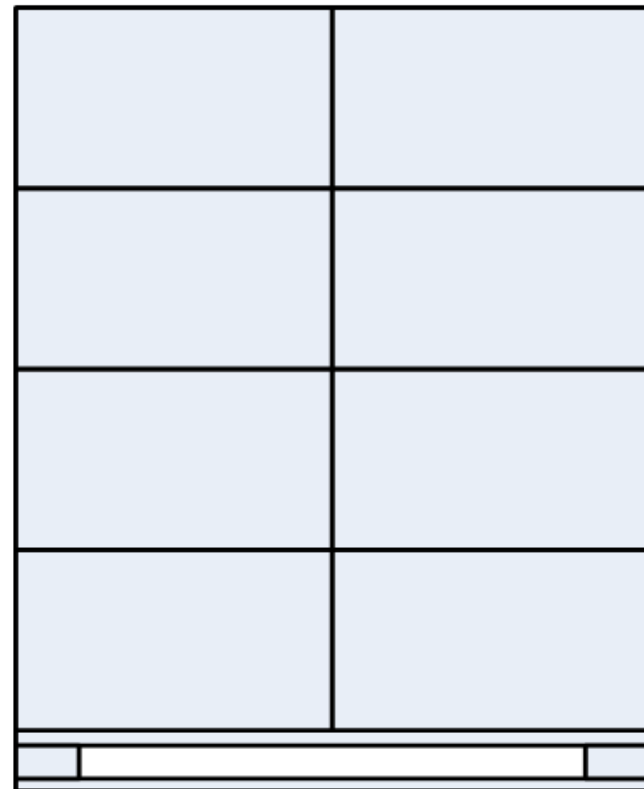
- GTIN – Global Trade Item Number
 - (01)17030640000016
 - 14 digits
- GLN – Global Location Number
 - (414)7030640001532
 - 13 digits
- SSCC – Serial Shipping Container Code
 - (00)3703064000000000003
 - 18 digits
- All 3 important for Traceability

Identification of units

 **CONSUMER PACKAGE** (e.g. 250 g)
GTIN: EAN 8 OR EAN 13



RETAIL PACKAGE (e.g. 20 kg CARTON)
TRADE UNIT: GTIN EAN 14



RETAIL PACKAGE (e.g. 750 kg)
TRADE UNIT: GTIN EAN 14
LOGISTIC UNIT: SSCC

EAN Application identifiers used

AI	TITLE	FORMAT
01	GTIN	n2+n14
3101	Net weight, kg	n4+n6
37	Count of trade items contained in the logistic unit	n2+n8
00	SSCC	n2+n18
10	Batch or lot number	n2+an20

TraceFish specifies a global unique identifier for trade units: GTIN +

■ GTIN +

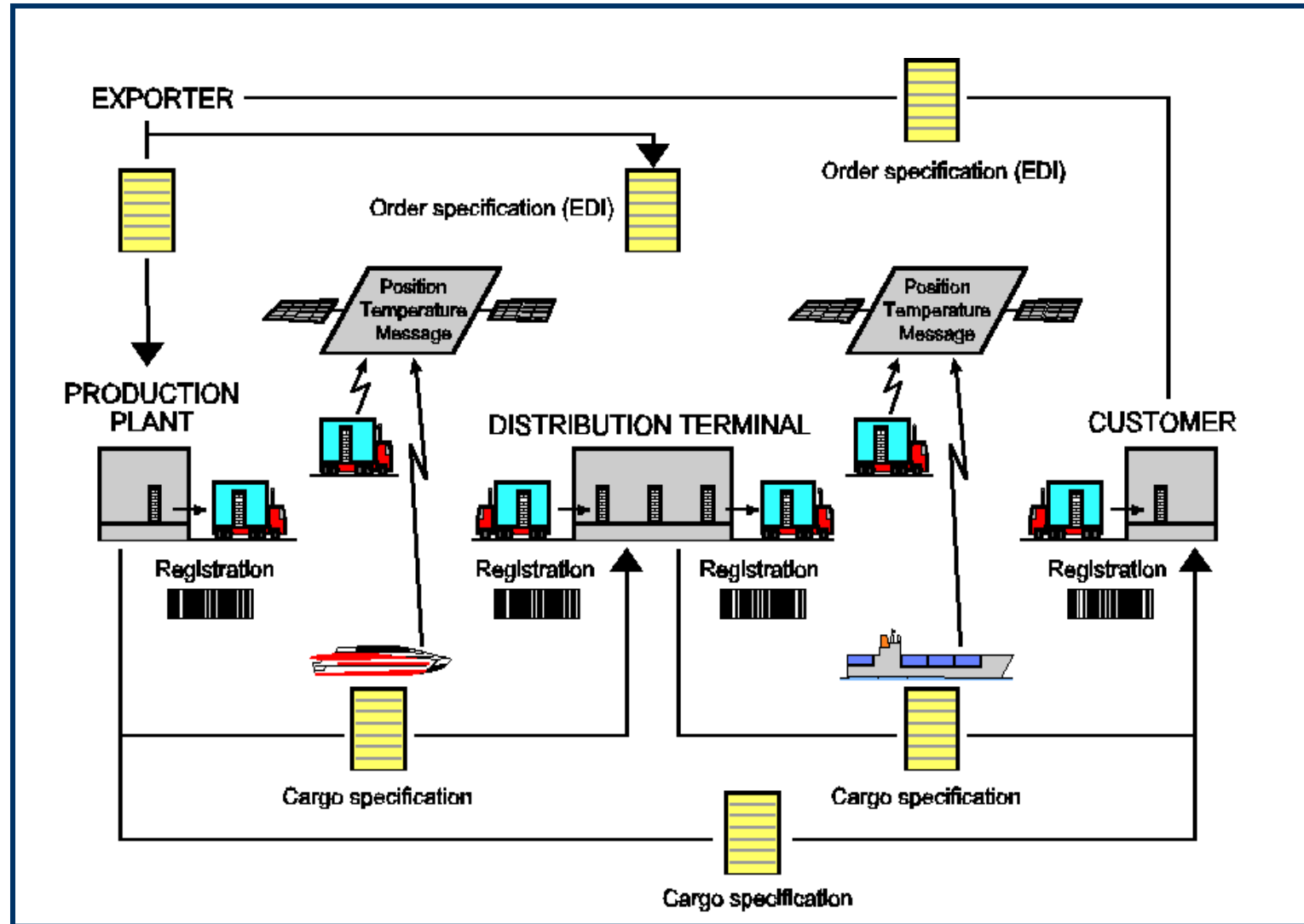
- Unique identification of trade unit
- GTIN
- Batch Number
- Serial Number

Description	EAN identifications	EAN AI	Example
Trade unit	GTIN Batch number Serial number	AI (01) AI (10) AI (21)	(01)17030640000016 (10)1234567cc01dd4kk7890 (21)01234567891011121314

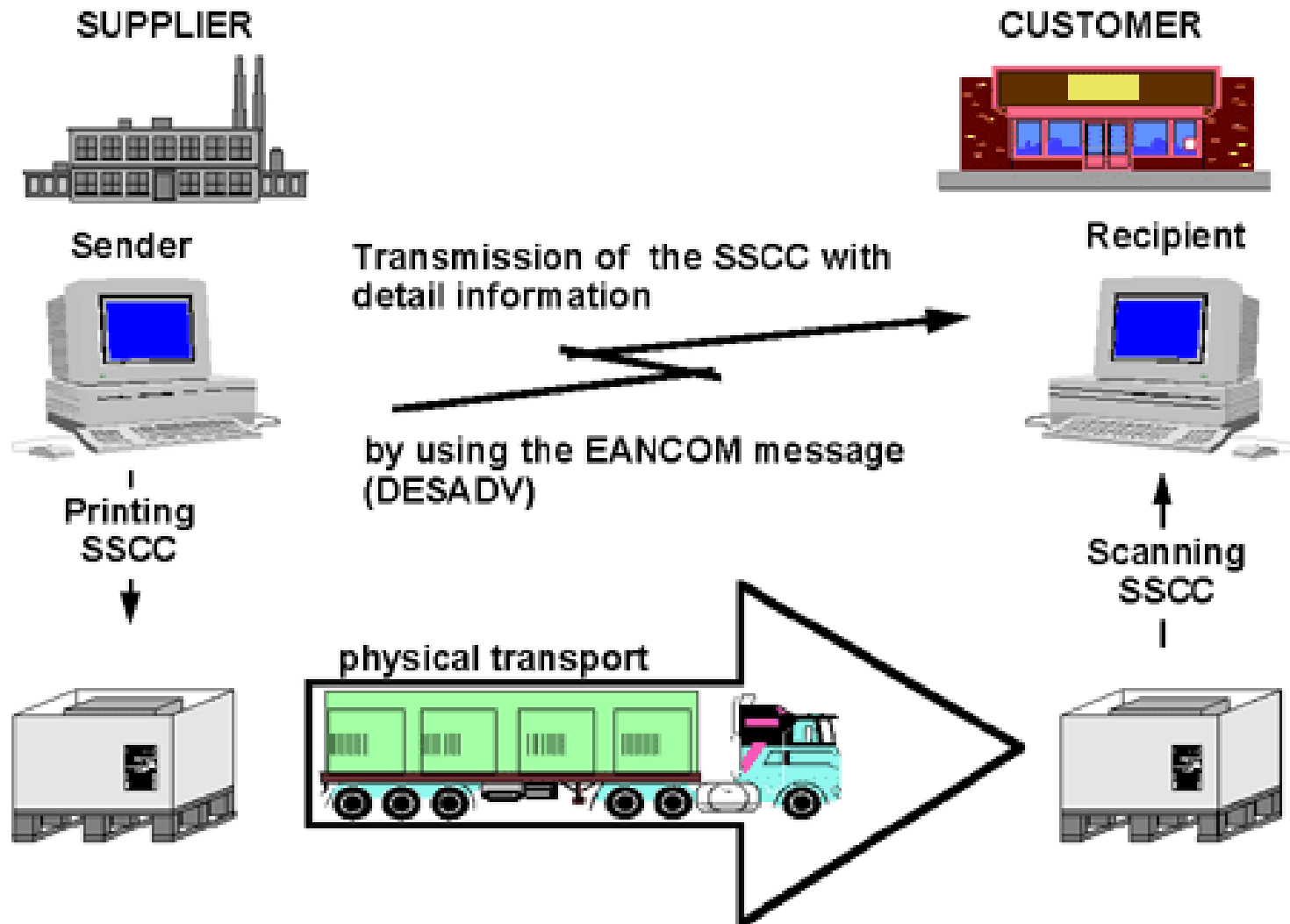
The Tracefish project: 2001-2002



Electronic supply chain concept

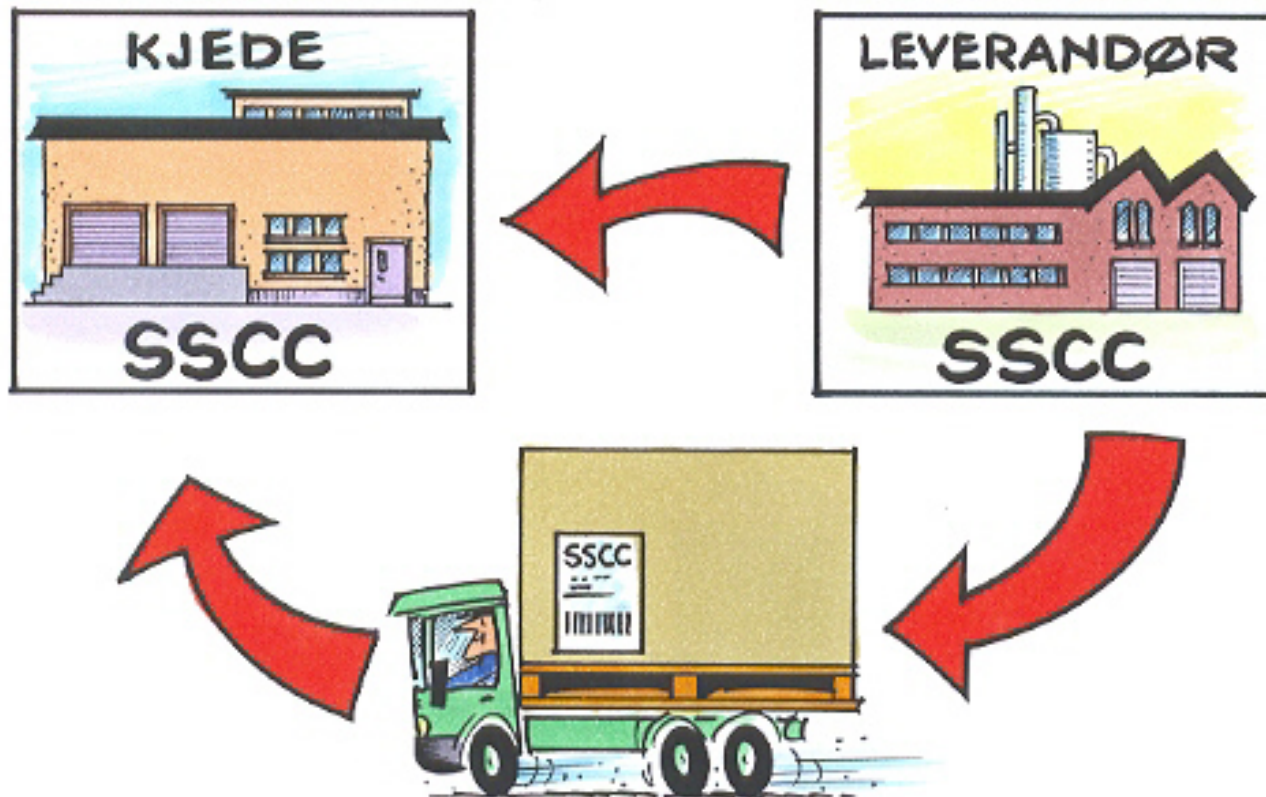


Logistic information flow

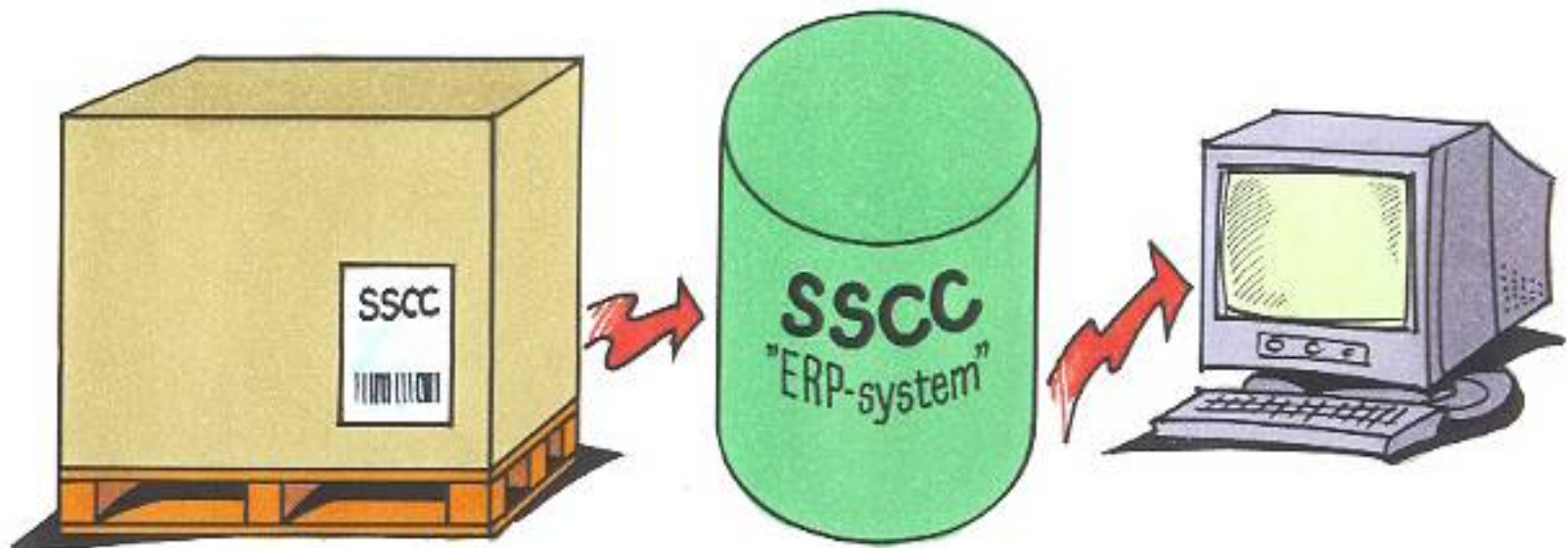


Source: GS1

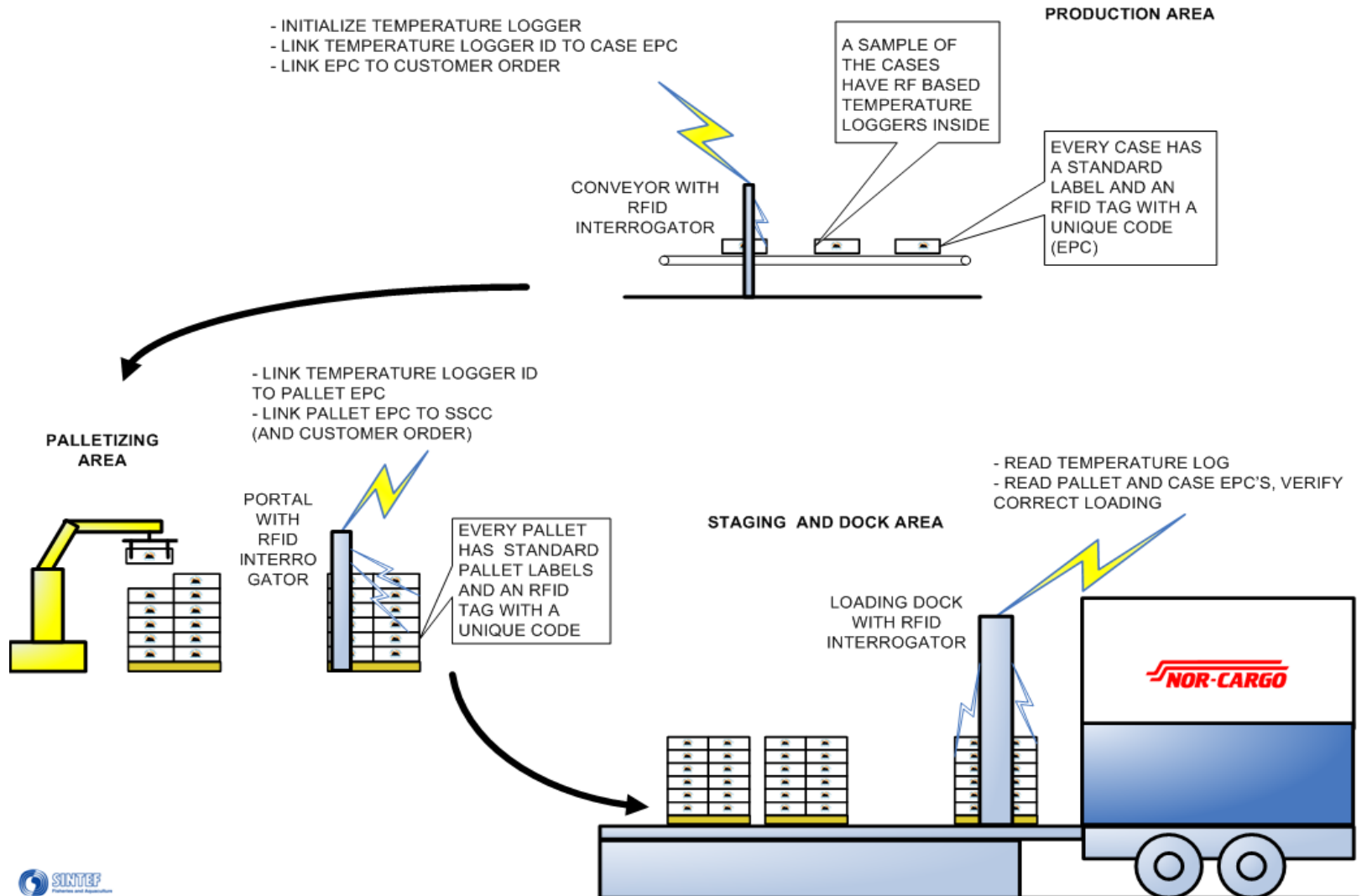
Physical labelling and electronic label



Perfect record keeping - full traceability



Production



Traceable units: Pallets with 27 cartons



Distribution

- READ TEMPERATURE LOG, HANDLE EXCEPTIONS
- READ PALLET AND CASE EPC'S, VERIFY THAT CORRECT GOODS IS RECEIVED
- PROCESS HANDLING INSTRUCTIONS (TO STORAGE OR CROSS-DOCKING)

DOCK AREA

DOCK WITH RFID INTERROGATOR

NOR-CARGO

STORAGE AND PICK AREA

VERIFY THAT THE CORRECT CASE IS PICKED USING HAND-HELD READER

VERIFY THAT PALLETS ARE BUILT ACCORDING TO CUSTOMER ORDER

PORTAL WITH RFID INTERROGATOR

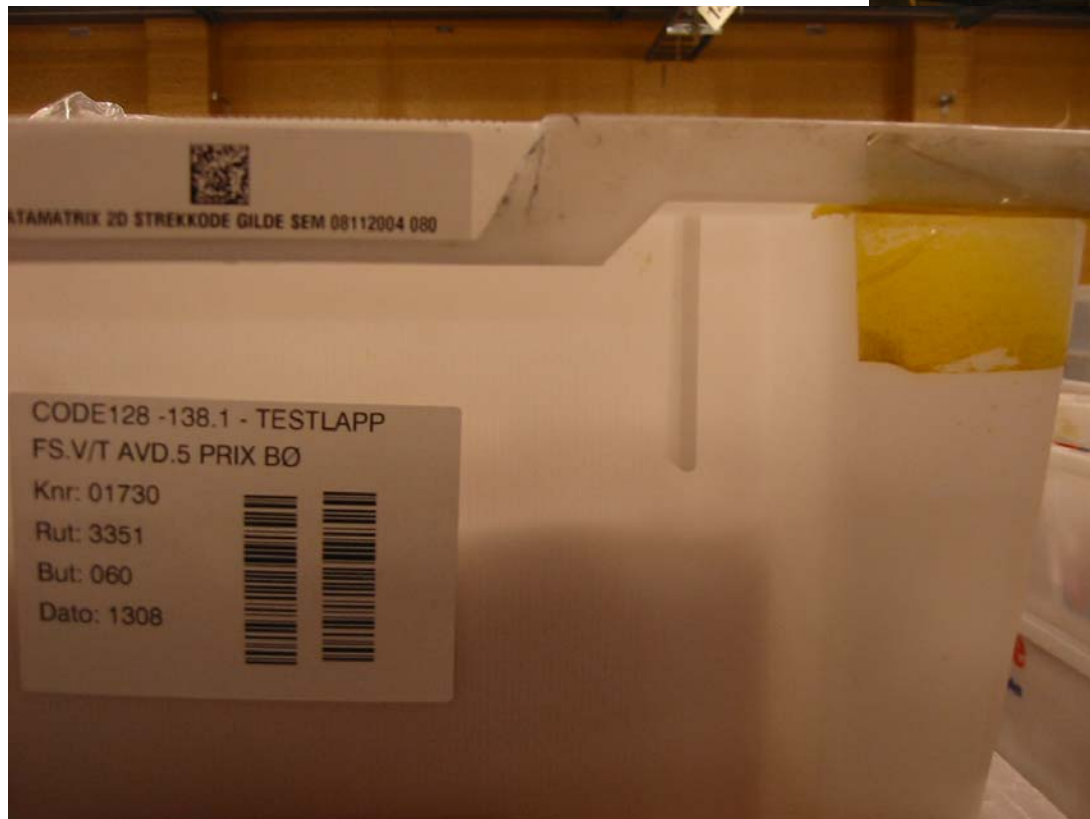
- READ TEMPERATURE LOG
- READ PALLET AND CASE EPC'S, VERIFY CORRECT LOADING

LOADING DOCK WITH RFID INTERROGATOR

NOR-CARGO

STAGING AREA

Bar Code reading



NS 9405 - Pallet label

QUALITY:

SUPERIOR

TREATMENT:

GUTTED

PRESERVATION:

FRESH

STORAGE TEMP:

0 °C

EAN No:

97033350311027

SSCC:

370333500057403025

SPECIE:

SALMON
N E C H - 4832

SIZE:

2,5 - 3,0 KG

No in UNIT:

27

PROD. DATE:

30.01.1998

NET.W.:

554,5 KG

EXP:

EXPORT AS

SUPL:

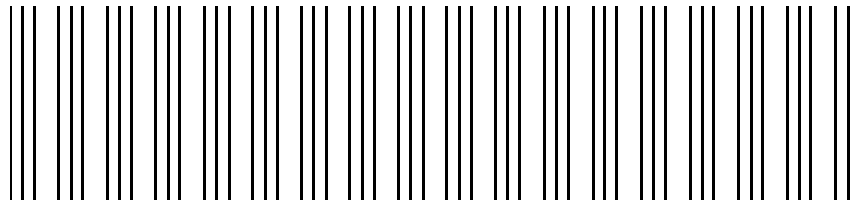
HJ 003.2

BATCH No:

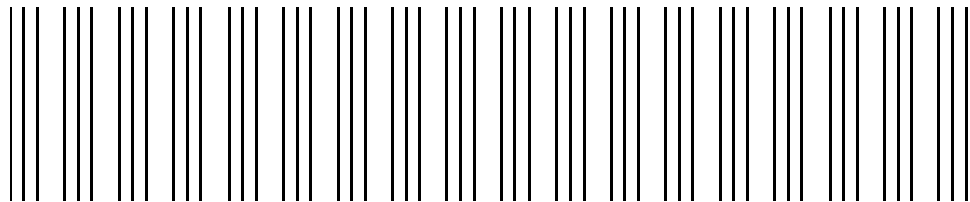
1234567891

PL. No:

123



(01) 97033350311027 (3101)05545 (37)27



(00)370333500057403025 (10)1234567891

Case Label NS 9405

QUALITY:

SUPERIOR

TREATMENT:

GUTTED

PRESERVATION:

FRESH

STORAGE TEMP:

0 °C

SIZE:

2,5 - 3,0 KG

PCS:

8

PROD. DATE:

30.01.1998

NET.W.:

20,5 KG

EXP:

EXPORT AS

SUPL:

HJ 003.2

BATCH No:

1234567891

PL. No: UNIT No:

123 12

EAN No:

97033350311027

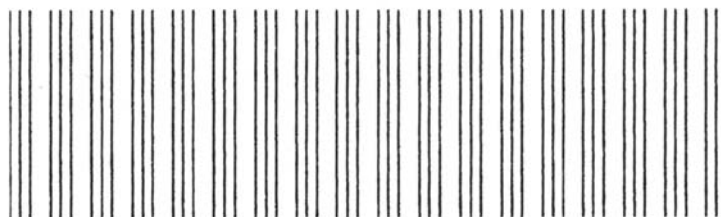
SPECIE:

SALMON

N EC H - 4832



(01) 97033350311027 (3101)000205 (30)8

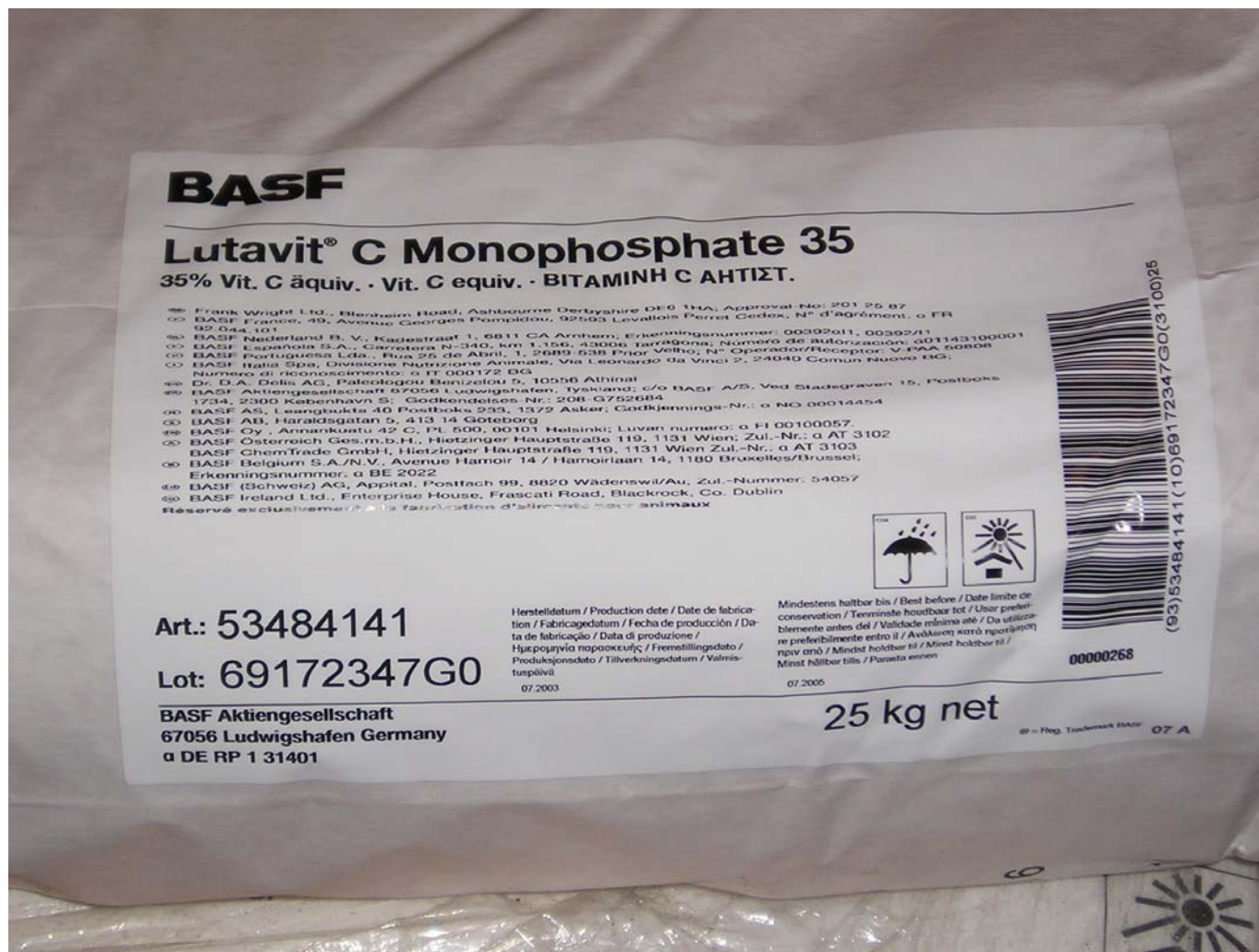


(11)980130 (10)1234567891 (21)12

Logistic unit identification: SSCC



Traceability infrastructure – Identification of units throughout the chain



Traceable units: Truckload with 20 tons



Hand held Bar Code Readers



Hand held Bar Code Readers



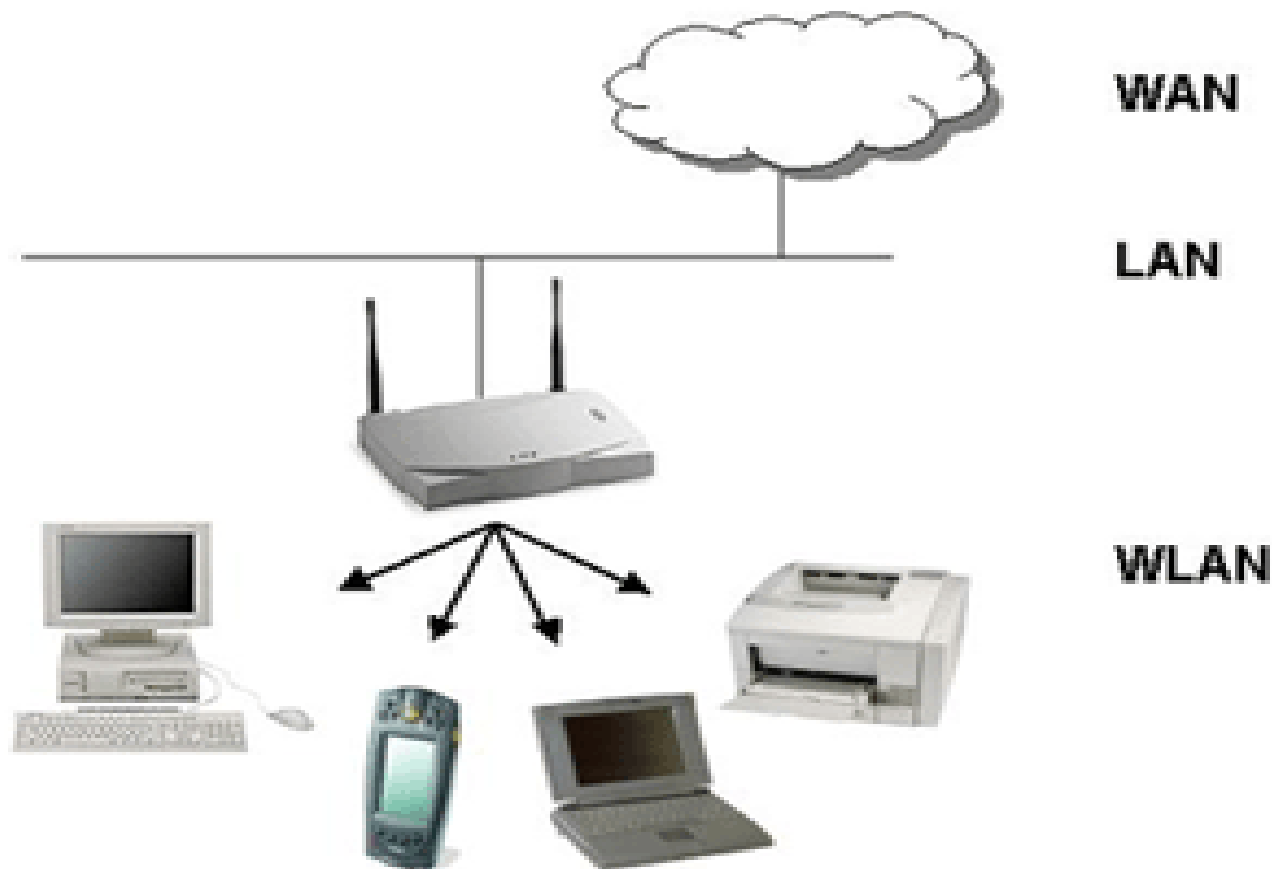
Bar Code printers



Bar Code printers



Bar Code System solutions



Access points wirelessly transmit data to and from network devices, connect wireless devices to the wired LAN, and the internet.

Summary

- Bar Codes may be a very important tool in the Traceability infrastructure
- Now common in many countries, both in the retail business and in supply chains
- The codes contain traceability related information (e.g. unique reference)
- Bar Codes facilitates automated data capture and simplifies information flow
- GS1 (EAN/UCC) provides a globally standardised and a wide spread number system which can be applied in logistics and traceability systems
- Based on this number system TraceFish has suggested how to unique identify traceable units (Trade Unit)
- The EU-legislation requires that “Products placed on the market shall be **adequately labelled or identified** to facilitate traceability”. Labels using the GS1 number system (and TraceFish recommendations) fulfil this requirement.